

The Aging Worker: Physiological and Functional Considerations

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Goals and Objectives:

Describe normal physiological changes of aging and functional implications.

Identify high risk tasks in aging workers.

Examine medical records for terminology separating acute injury versus normal aging findings.

Acknowledge incidence of radiographic abnormalities in the aging population

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Defining Aging Worker

- Biological
- Psychological
- Social
- Functional

Definitions of Aging Workforce

- Over 40 years - Age Discrimination in Employment Act 1967
- Over 55- Literature
- Over 65 -OASDI Social Security

According to the U.S. Bureau of Labor Statistics (BLS), in 2016, 35 million workers age 55 and older were in the labor force, representing nearly 22% percent of the total, or just above one in five workers.

By 2024, BLS projects 40.1 million workers age 55 and older, representing 24.7 percent of the total, or one in four workers, will be in the labor force

Over the next decade, the number of “prime-age” workers in the labor force (between the ages of 25 and 54) will grow by -1.3 percent, compared to a projected 55 percent growth in the number of workers who are at least 65 years old (BLS, 2015).

Laws Protecting Aging Workers

- Age Discrimination in Employment Act
- Older American Act 1965
- Civil Rights Act 1964
- Americans with Disabilities Act 1990

Benefits of an Older Worker

- Older workers are more willing to work different schedules,
- Older workers serve as mentors for workers with less experience,
- Older workers have invaluable experience,
- Older workers are more reliable,
- Older workers add diversity of thought/approach to team projects,
- Older workers are more loyal,
- Older workers take work more seriously,
- Older workers have established networks of contacts and clients,
- Older workers have higher retention rates,
- Older workers have more knowledge and skills, .
- Older workers are readily available, and
- Older workers are more productive

Conditions Associated with Aging

Age-related limitations can involve a wide range of conditions, including depression and anxiety, addiction, repetitive use, and other cognitive, sensory, and physical limitations.

Arthritis, diabetes, osteoporosis, dementia, and hypertension are among the most prevalent conditions that increase with age (Abel, 2005).

Physical Changes of Aging

- • *Strength - 25-30 percent decrease at 65 yrs*
- • *Flexibility - 18-20 percent decrease at 65 yrs*
- • *Balance – One-third of 65 yrs or older fall each year*
- • *Sight – All aspects deteriorate*
- • *Reaction time and speed – Decreases*
- • *Hearing – One-third of 65-74 yr olds have problems*
- • *Manual dexterity and tactile feedback – Motor skills deteriorate*
- • *Body fat – Increases*

Physiologic Changes of Aging

- *Oxygen exchange – 40 percent decrease at 65 yrs*
- *Respiratory system – 25 percent less at 65 yrs, 50 percent less at 70 yrs*
- *Cardiovascular system – 15-20 percent less at 65 yrs*
- *Systemic blood pressure – Increases*
- *Fatigue – Occurs more rapidly*
- *Extreme temperatures – More challenging*

**Top Two Places Are the Same for 65+ and
All Ages—Sprain Rotator Cuff Is 3rd for 65+
and Is Above Average for Severity**

All Claims	Rank by Claim Counts		Average Incurred \$ at 18 Months	
	65+	All Ages	65+	All Ages
Open Wnd Finger/s Comp	1	1	400	350
Sprain Lumbar Region	2	2	4,360	2,480
Sprain Rotator Cuff	3	28	28,360	21,910
Sprain of Neck	4	4	6,230	3,930
Lower Leg Injury Nos	5	8	6,040	4,240
Open Wound Hand/s Comp	6	6	650	410
Contusion of Knee	7	19	2,000	1,050
Sprain Lumbosacral	8	3	3,400	2,430
Carpal Tunnel Syndrome	9	7	15,790	12,180
Contusion Face/Scalp/Nck	10	21	1,350	690
All			8,930	4,850

Exhibit 11. Rotator Cuff Sprains Rank High for 65+

	Rank by Total Incurred		Total Incurred \$ at 18 months		Average Incurred \$ at 18 months	
	65 & over	All ages	65 & over	All ages	65 & over	All ages
All Claims						
Sprain Rotator Cuff	1	4	25,211,350	659,039,230	28,360	21,910
Lumbar Disc Displacement	2	1	11,224,940	1,391,478,750	31,530	29,700
Oth Brain Inj-Loc Nos	3	14	11,208,060	353,783,260	47,090	24,730
Carpal Tunnel Syndrome	4	2	9,395,270	965,530,030	15,790	12,180
Tear Med Menisc Knee-Cur	5	6	9,035,960	515,023,020	21,060	18,220
Rotator Cuff Synd Nos	6	9	8,059,680	437,360,990	18,920	14,670
Fx Neck of Femur Nos-CI	7	88	7,903,230	34,369,100	49,710	36,520
Lumbosacral Neuritis Nos	8	5	6,878,850	649,598,070	23,010	24,080
Cervicalgia	9	3	6,820,950	737,014,250	15,860	15,760
Lumb/Lumbosac Disc Degen	10	10	6,592,010	415,879,920	29,170	26,500
All	—	—	400,438,650	22,200,386,430	8,930	4,850

H.Shuford 2005

Diagnosis Mix and Indemnity Severity Index Differences

Top 10 Claim Diagnoses for Lost-Time Claims With Temporary Payments That Closed Within 24 Months of Date of Injury, Accident Years 1996-2007

Ages 20–34			Ages 45–64		
Diagnosis and Indemnity Severity Index			Diagnosis and Indemnity Severity Index		
1	Sprain Lumbar Region	0.32	Sprain Rotator Cuff		2.98
2	Lower Leg Injury, not otherwise specified	0.62	Unilateral Inguinal Hernia		0.49
3	Sprain of Ankle, not otherwise specified	0.21	Carpal Tunnel Syndrome		1.64
4	Unilateral Inguinal Hernia	0.38	Tear Medial Cartilage/Meniscus of Knee		1.75
5	Cervicalgia	1.07	Lower Leg Injury, not otherwise specified		1.01
6	Lumbar Disc Displacement	2.21	Sprain Lumbar Region		0.43
7	Carpal Tunnel Syndrome	1.31	Cervicalgia		1.89
8	Lumbago	0.50	Rotator Cuff Syndrome, unspecified		2.38
9	Sprain Lumbosacral	0.25	Lumbar Disc Displacement		2.83
10	Sprain of Neck	0.38	Lumbosacral Neuritis, not otherwise specified		2.19

The severity index is the ratio of paid temporary indemnity severity for that diagnosis and age cohort to average paid temporary indemnity severity for all claims.

Source: NCCI

Diagnosis Mix and Medical Severity Index Differences

Top 10 Claim Diagnoses for Lost-Time Claims With Temporary Payments That Closed Within 24 Months of Date of Injury, Accident Years 1996-2007

	Ages 20–34		Ages 45–64	
	Diagnosis and Medical Severity Index		Diagnosis and Medical Severity Index	
1	Sprain Lumbar Region	0.30	Sprain Rotator Cuff	2.66
2	Lower Leg Injury, not otherwise specified	0.72	Unilateral Inguinal Hernia	0.94
3	Sprain of Ankle, not otherwise specified	0.20	Carpal Tunnel Syndrome	1.28
4	Unilateral Inguinal Hernia	0.83	Tear Medial Cartilage/Meniscus of Knee	1.69
5	Cervicalgia	0.99	Lower Leg Injury, not otherwise specified	0.93
6	Lumbar Disc Displacement	1.75	Sprain Lumbar Region	0.36
7	Carpal Tunnel Syndrome	1.15	Cervicalgia	1.48
8	Lumbago	0.47	Rotator Cuff Syndrome, unspecified	2.18
9	Sprain Lumbosacral	0.25	Lumbar Disc Displacement	1.92
10	Sprain of Neck	0.38	Lumbosacral Neuritis, not otherwise specified	1.58

The severity index is the ratio of paid medical severity for that diagnosis and age cohort to average paid medical severity for all claims.

Source: NCCI

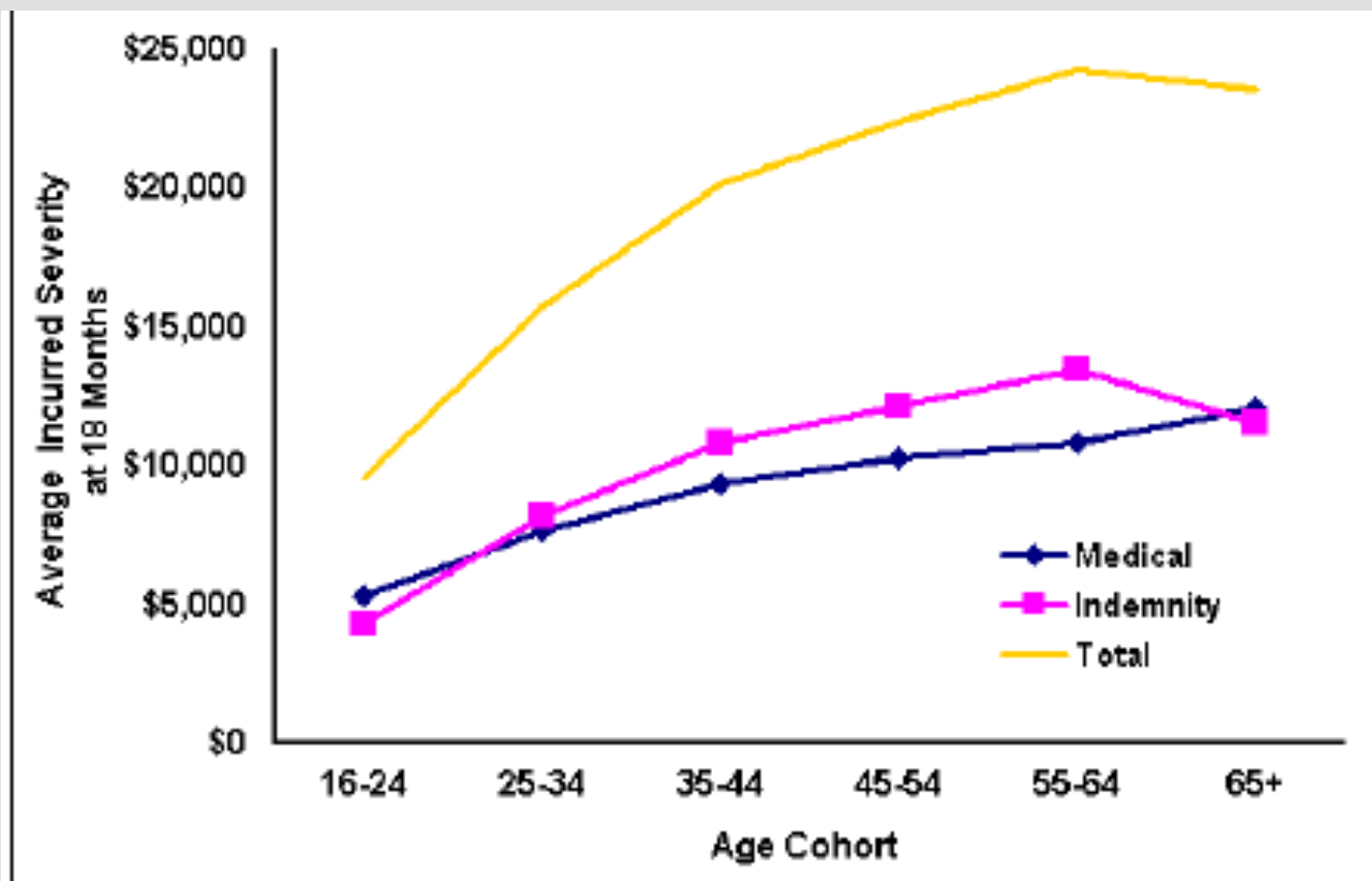


Exhibit 4. Average Incurred Severity at 18 Months for All Lost-Time Claims

Workers Compensation Considerations for the Provider

Causation vs Association

Post hoc ergo propter hoc.

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The rooster crowed (post hoc) and
the sun came up. (ergo propter hoc)

Conclusion: The crowing rooster
made the sun rise.

There is an association but is
crowing causal?

Hill Criteria for Causality

- Temporality
- Strength of Association
- Dose response
- Consistency
- Coherence
- Specificity
- Plausibility
- Reversibility
- Prevention/elimination
- Experiment
- Analogy
- Predictive Performance

“Doctor, Mr. Jones began having back pain after performing his work activities on March 17, 2017. Is it your opinion to a reasonable degree of medical certainty that his work activity was the prevailing factor in the need for medical treatment and the resultant work disability?
(post hoc, ergo propter hoc?)

“Yes! (ipse dixit)

Missouri Compensation

- Work must be “prevailing factor” in causation 287.140.1 August 2005
- It is felt that the patient’s work activity on (date) **is/is not** the prevailing factor in the need for medical treatment and the resultant work disability

Causation

- Patient history can be unreliable
- Physical examination not helpful unless significant underlying medical condition found
- Testing may be required before causation can be determined
- Medical records showing previous treatment of effected part extremely helpful

Testing

- Normal changes of aging on Xray/MRI occur
- Delineating acute injury from previous injury on MRI may be difficult
- EMG specific for acute neuropathic process (physiological)
- Previous studies and reports of effected part extremely helpful

Abnormal MRI Findings in Asymptomatic Patients

- MRI Cervical 86% in 60yo male (Matsumoto 1997)
- MRI Lumbar- 57% in 65 yo (Boden 2006)
- MRI Shoulder- 54% in 60yo+(Scher 1995)
- MRI Knee 68% cartilage 60+yo(Guermazi 2012)
- MRI Arthrogram Shoulder
- MRI Arthrogram Wrist – 74% total, 29%TFCC (Maizlen 2008)
- MRI Arthrogram Hip – 69% labral tear avg 38 years (Register 2012)

MRI Arthrogram Abnormalities in Asymptomatic Patients

- MRI Arthrogram Wrist – 74% total, 29%TFCC (Maizlen 2008)
- MRI Arthrogram Hip – 69% labral tear avg 38 years (Register 2012)
- MRI Arthrogram Shoulder

MRI terms distinguishing Chronic versus Acute Findings

Chronic

- Low Signal
- Fatty infiltration
- Cystic changes

Acute

- Increased Signal T2

Claims Management

- Was patient physically and cognitively capable of performing job prior to injury?
- What are the non physiological factors affecting outcome?

Modified duty, Reintegration and Job Transfer Considerations

Muscle Pain and Stiffness:

- ³⁵₁₇ Implement ergonomic workstation design, i.e., ergonomic chair and adjustable
- ³⁵₁₇ Use a workstation to alternate between sitting and standing
- ³⁵₁₇ Reduce repetitive tasks or interrupt the tasks with other duties
- ³⁵₁₇ Provide carts and lifting aids
- ³⁵₁₇ Modify work-site temperature and/or dress code
- ³⁵₁₇ Use fan/air-conditioner or heater at the workstation
- ³⁵₁₇ Allow work from home during extremely hot or cold weather

Fatigue/Weakness:

³⁵₁₇ Reduce or eliminate physical exertion and workplace stress

³⁵₁₇ Schedule periodic rest breaks away from the workstation

³⁵₁₇ Allow a flexible work schedule and flexible use of leave time

³⁵₁₇ Allow a self-paced workload

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³⁵₁₇ Provide parking close to the work-site and an accessible entrance

³⁵₁₇ Install automatic door openers

³⁵₁₇ Provide an accessible route of travel to other work areas used by the employee

³⁵₁₇ Move workstation close to other work areas, office equipment, and break rooms

Gross Motor Impairment:

- ³⁵₁₇ Modify the work-site to make it accessible
- ³⁵₁₇ Provide parking close to the work-site
- ³⁵₁₇ Provide an accessible entrance
- ³⁵₁₇ Install automatic door openers
- ³⁵₁₇ Provide an accessible restroom and break room
- ³⁵₁₇ Provide an accessible route of travel to other work areas used by the employee
- ³⁵₁₇ Modify the workstation to make it accessible
- ³⁵₁₇ Adjust desk height if wheelchair or scooter is used
- ³⁵₁₇ Make sure materials and equipment are within reach range
- ³⁵₁₇ Move workstation close to other work areas, office equipment, and break rooms
- ³⁵₁₇ Provide lifting devices and carts

Hearing Limitations:

³⁵₁₇ Provide visual or tactile alerting device

³⁵₁₇ Implement a buddy system

³⁵₁₇ Provide an assistive listening device (ALD)

³⁵₁₇ Provide communication access real-time translation (CART)

³⁵₁₇ Provide computer-assisted note taking

³⁵₁₇ Address environmental factors, i.e., background noise, lighting, and positioning

³⁵₁₇ Provide an interpreter

³⁵₁₇ Use Web-based meeting software or video conferencing

³⁵₁₇ Provide standard note taking or other text information

³⁵₁₇ Allow tape recording of meetings

³⁵₁₇ Provide speech recognition software

Vision Limitations:

³⁵₁₇ Magnify written material using hand/stand/optical magnifiers

³⁵₁₇ Provide large print material or screen reading software

³⁵₁₇ Control glare by adding a glare screen to the computer

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³⁵₁₇ Install proper office lighting

³⁵₁₇ Allow frequent rest breaks

Respiratory Difficulties:

³⁵₁₇ Provide adjustable ventilation

³⁵₁₇ Keep work environment free from dust, smoke, odor, and fumes

³⁵₁₇ Implement a "fragrance-free" workplace policy and a "smoke-free" building policy

³⁵₁₇ Avoid temperature extremes

³⁵₁₇ Use fan/air-conditioner or heater at the workstation

³⁵₁₇ Redirect air-conditioning and heating vents

Maintaining Concentration:

- ³⁵₁₇ Reduce distractions in the work area
- ³⁵₁₇ Provide space enclosures or a private office
- ³⁵₁₇ Allow for use of white noise or environmental sound machines
- ³⁵₁₇ Allow the employee to play soothing music using a cassette player and headset
- ³⁵₁₇ Increase natural lighting or provide full spectrum lighting
- ³⁵₁₇ Reduce clutter in the employee's work environment
- ³⁵₁₇ Plan for uninterrupted work time
- ³⁵₁₇ Divide large assignments into smaller tasks and steps
- ³⁵₁₇ Restructure job to include only essential functions

Medical Treatment Allowances:

³⁵₁₇ Provide flexible schedules

³⁵₁₇ Provide flexible leave

³⁵₁₇ Allow a self-paced workload with flexible hours

³⁵₁₇ Allow employee to work from home

³⁵₁₇ Provide part-time work schedules

Psychological Aspects of Aging (Depression and Anxiety):

³⁵₁₇ Develop strategies to deal with work problems before they arise

³⁵₁₇ Provide sensitivity training to coworkers

³⁵₁₇ Allow telephone calls during work hours to doctors and others for support

³⁵₁₇ Provide information on counseling and employee assistance programs

³⁵₁₇ Allow time off for medical treatment

Activities of Daily Living:

- ³⁵₁₇ Allow use of a personal attendant at work
- ³⁵₁₇ Allow use of a service animal at work
- ³⁵₁₇ Make sure the facility is accessible
- ³⁵₁₇ Move workstation closer to the restroom
- ³⁵₁₇ Allow longer breaks or more frequent, shorter breaks
- ³⁵₁₇ Refer to appropriate community services
- ³⁵₁₇ Provide access to a refrigerator

Claims management in the aging worker may require obtaining previous medical records and increased communication efforts with the employer and the medical provider.

References

- H. Shuford, NCII Brief, Vol 1, May 2005
- L. Perry, Designing the Workplace for the Aging Workforce, Zurich
- B. Loy, Job Accomodation Network, askjan.org, February 2013
- M Heidkamp, J Christian, NTAR Leadership Brief March 2013
- https://www.ncci.com/Articles/Documents/II_2011_Aging_Workforce_Research_Brief.pdf